SOLAR SCIENCE PROGRAM

(..: items with '..' in front added during plenary session)

What? Why? How? When?

..The Sun as a Star

..(Inform astronomy using solar physics)
..large-scale irradiance anisotropy

Particle Acceleration

(PASO (Particle Acceleration Solar Observatory)).
Combine or coordinate with Solar Orbiter?
Fundamental physics
Effect on Earth activites
0.2-AU imaging and *in-situ* instrument
Radio, EUV, x-ray imaging...
X-ray/Gamma-ray imaging spectroscopy
Near term [in position by 2012]

Energy Flow and Structure in the Solar Atmosphere

(Reconnection and Microscale Probe (RAM)
Magnetic TRAnsition Region Probe (MTRAP)
Near Infrared Chromosphere Observatory (NICO)
Solar Probe; Solar Orbiter)
Coronal and chromospheric heating
-small-scale reconnection (breakdown of MHD)
..-turbulence and its relation to space plasma physics
-role of waves
Time/space resolved spectroscopy
High resolution imaging
in situ sampling of coronal plasma
..wave-particle interactions
..Cross-scale interactions
Near to Intermediate term

Solar Wind Origins

(Solar Probe; Solar Polar Orbiter; Solar Orbiter)
Map the top of the corona
Acceleration of fast & slow wind
Solar wind directly impacts Earth [space weather]
Magnetic flux, helicity flow
Time/space resolved spectroscopy
in situ sampling (composition variations)
moderate resolution imaging

Intermediate term

Flow of Energy from the Sun to the Earth

(SDO, Solar-B, SORCE, STEREO, MTRAP, RAM)
Creation and Annhiliation of Magnetic Fields
CMEs/Flares
Irradiance variations (mechanisms of solar influence on climate)
..Comparison with similar other stars in grand minima
Solar Wind
Cross-scale coupling
Evolution of helicity as key to understanding solar dynamo
Bolometric imaging; Full-sun spectroscopy
Hi-res EUV imaging
Coronagraphy
Time/space resolved spectroscopy
Hi-res surface vector magnetic field measurements

Near term and intermediate term

Space Weather Prediction

(SDO; sentinels; farside observer; radio imager; GOES; NPOES (& other NOAA missions), STEREO)
Applied science
Terrestrial influence in the short-term
..what aspects are deterministic?
Physics of CME evolution and propagation (incl. HE particles and IP shocks)
Identification of CME onset
Source of solar wind variations that affect Earth

Continuing, immediate to long term

Solar Interior Structure and Dynamics [Flow of energy/mass in the interior; focus on the base of the convection zone]

(SDO; Solar Orbiter; Solar Polar Imager; Farside)
Long-Term Variation of the Sun
Dynamo (source of magnetic flux emergence)
..Compare with observations of other stars' dynamos
Mechanisms of flux emergence
Destiny of the solar system
Helioseismology (SDO; ?)
Polar/multiple-view imaging for HS

Immediate to long term